● General Description

The ZMD68304N combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

● Features

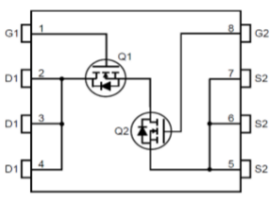
- ■ Advance high cell density Trench technology
- ■Low $R_{DS(ON)}$ to minimize conductive loss
- ■Low Gate Charge for fast switching
- ■Dual DIE in one package

●Application

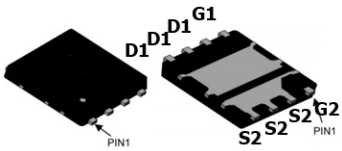
- ■ DC/DC Converters in Computing
- ■ Isolated DC/DC Converters in Telecom and Industrial

● Product Summary

V_{DS1} =30V
V_{DS2} =30V
$R_{DS(ON)1}$ =4.5mΩ
$R_{DS(ON)2}$ =2.7mΩ
I_{D1} =60A
I_{D2} =95A



RoHS



DFN5 x 6

●Ordering Information:

Part NO.	ZMD68304N
Marking	ZMD68304
Packing Information	REEL TAPE
Basic ordering unit (pcs)	3000

●Absolute Maximum Ratings (T_C =25℃) (Q1)

Parameter	**Symbol**	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_{D@}$TC=25℃	60	A
	$I_{D@}$TC=75℃	45.6	A
	$I_{D@}$TC=100℃	37.8	A
Pulsed Drain Current ①	I_{DM}	135	A
Total Power Dissipation(TC=25℃)	P_D@TC=25℃	3.6	W
Total Power Dissipation(TA=25℃)	P_D@TA=25℃	0.69	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy@L=0.1mH	E_{AS}	125	mJ

●Thermal resistance(Q1)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.1	°C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	70	°C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	°C

●Electronic Characteristics(Q1)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V,I_D =250uA	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A		4.5	6	mΩ
		V_{GS}=4.5V, I_D=10A		6.5	9	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=10A		18		s
Source-drain voltage	V_{SD}	Is=20A			1.28	V

●Electronic Characteristics(Q1)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz	-	1650	-	pF
Output capacitance	C_{oss}		-	330	-	
Reverse transfer capacitance	C_{rss}		-	220	-	

●Gate Charge characteristics(T_a = 25℃)(Q1)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	V_{DD} = 25V	-	29	-	nC
Gate - Source charge	Q_{gs}	I_D = 5A	-	12	-	
Gate - Drain charge	Q_{gd}	V_{GS} = 10V	-	11	-	

●Absolute Maximum Ratings (T_C =25℃) (Q2)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	$I_{D@}$TC=25℃	95	A
	$I_{D@}$TC=75℃	72.2	A
	$I_{D@}$TC=100℃	59.9	A
Pulsed Drain Current ①	I_{DM}	230	A
Total Power Dissipation(TC=25℃)	P_D@TC=25℃	3.6	W
Total Power Dissipation(TA=25℃)	P_D@TA=25℃	0.69	W
Operating Junction Temperature	T_J	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃
Single Pulse Avalanche Energy@L=0.1mH	E_{AS}	180	mJ
Avalanche Current@L=0.1mH	I_{AS}	60	A

●Thermal resistance(Q2)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	2.5	° C/W
Thermal resistance, junction - ambient	R_{thJA}	-	-	70	° C/W
Soldering temperature, wavesoldering for 10s	T_{sold}	-	-	265	° C

●Electronic Characteristics(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} =0V,I_D =250uA	30			V
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} =V_{DS}, I_D =250uA	1.2		2.5	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS} =0V			1.0	uA
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±20V ,V_{DS} =0V			±100	nA
Static Drain-source On Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A		2.7	3.6	mΩ
		V_{GS}=4.5V, I_D=10A		4.5	5.5	mΩ
Forward Transconductance	g_{FS}	V_{DS} =25V, I_D=10A		18		s
Source-drain voltage	V_{SD}	Is=20A			1.28	V

●Electronic Characteristics(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz	-	2535	-	pF
Output capacitance	C_{oss}		-	196	-	
Reverse transfer capacitance	C_{rss}		-	139	-	

●Gate Charge characteristics(T_a = 25℃)(Q2)

Parameter	Symbol	Condition	Min.	Typ	Max.	Unit
Total gate charge	Q_g	V_{DD} = 25V	-	29	-	nC
Gate - Source charge	Q_{gs}	I_D = 5A	-	12	-	
Gate - Drain charge	Q_{gd}	V_{GS} = 10V	-	11	-	

Note: ① Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2% ;

• Channel characteristics curve(Q1)

Fig.1 Gate-Charge Characteristics

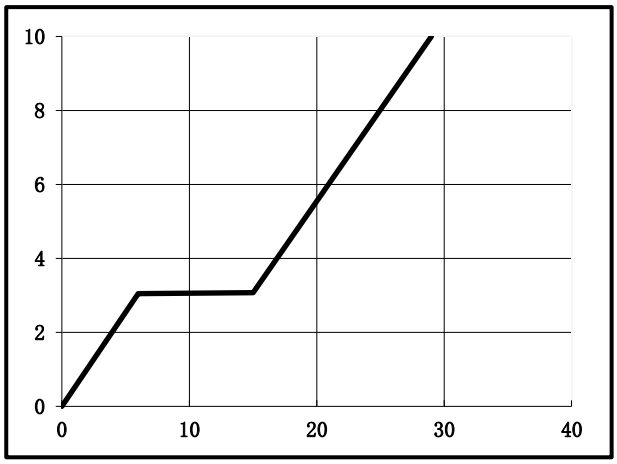


Fig.2 Capacitance Characteristics

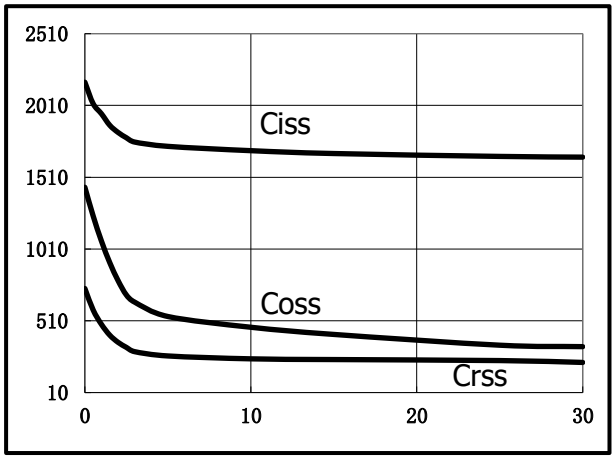


Fig.3 Power Dissipation

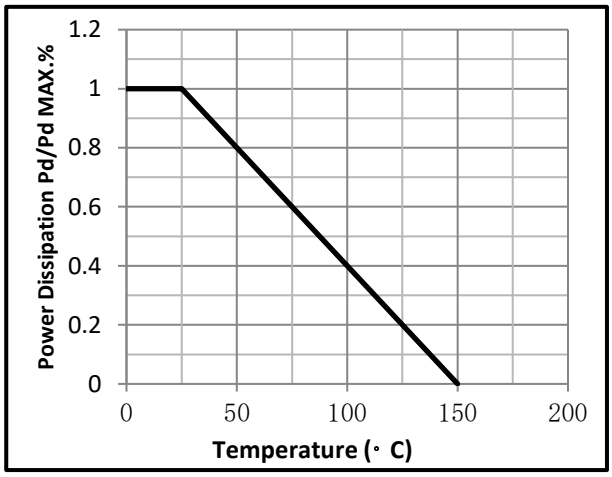


Fig.4 Typical output Characteristics

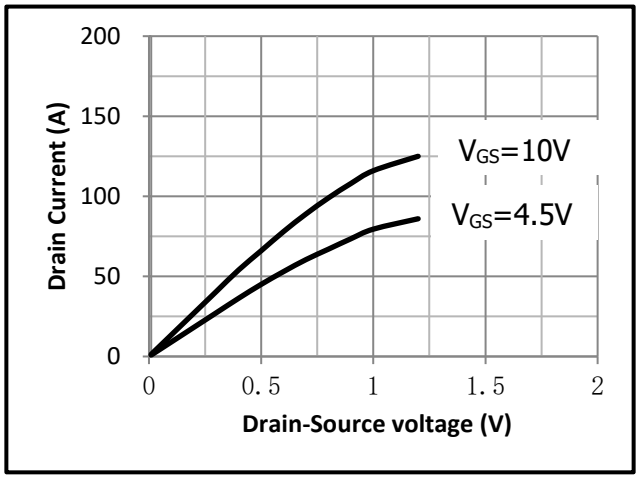


Fig.5 Threshold Voltage V.S Junction Temperature

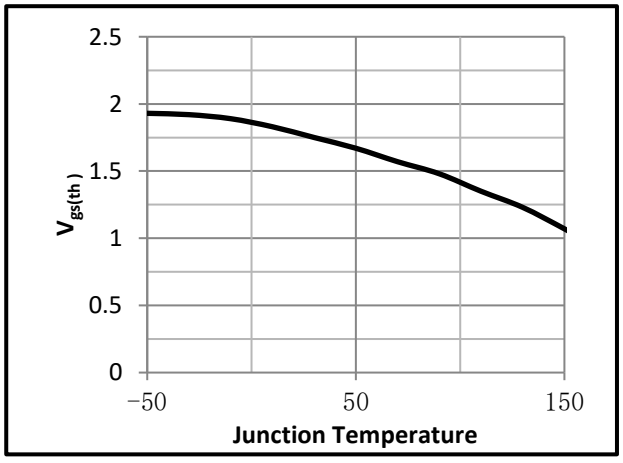


Fig.6 Resistance V.S Drain Current

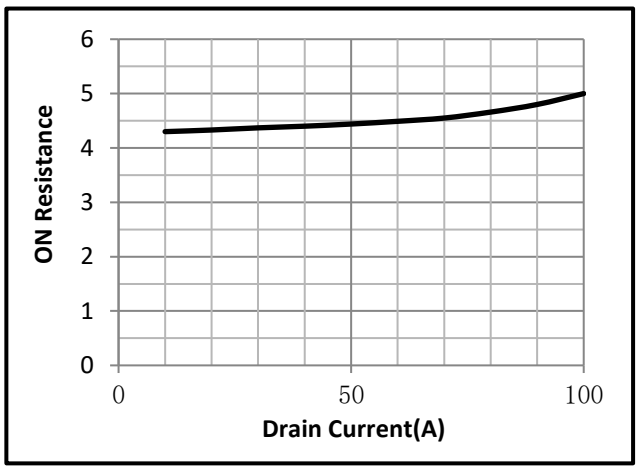


Fig.7 On-Resistance VS Gate Source Voltage

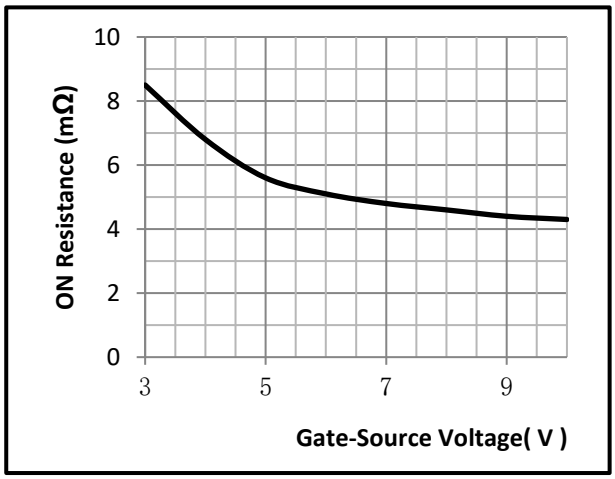
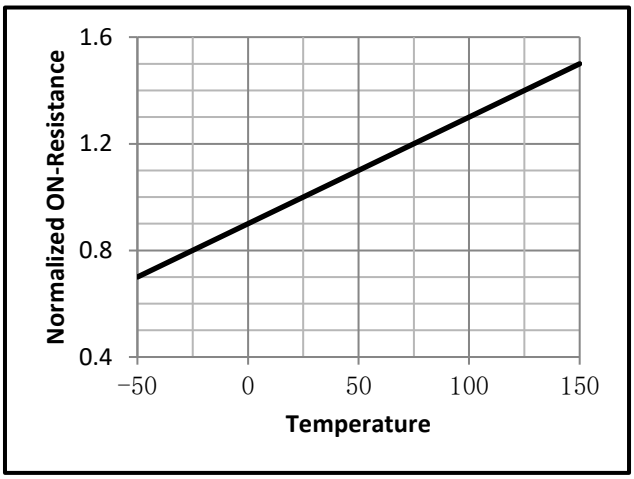


Fig.8 On-Resistance V.S Junction Temperature



• Channel characteristics curve(Q2)

Fig.9 Gate-Charge Characteristics

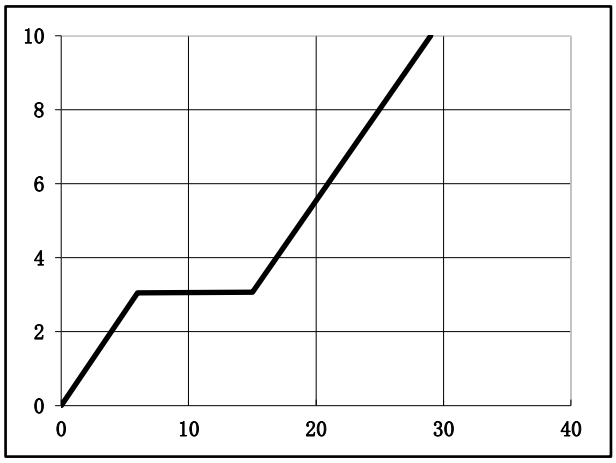


Fig.10 Capacitance Characteristics

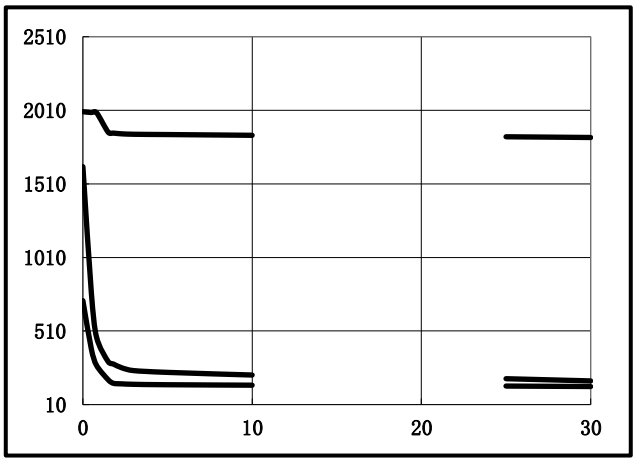


Fig.11 Power Dissipation

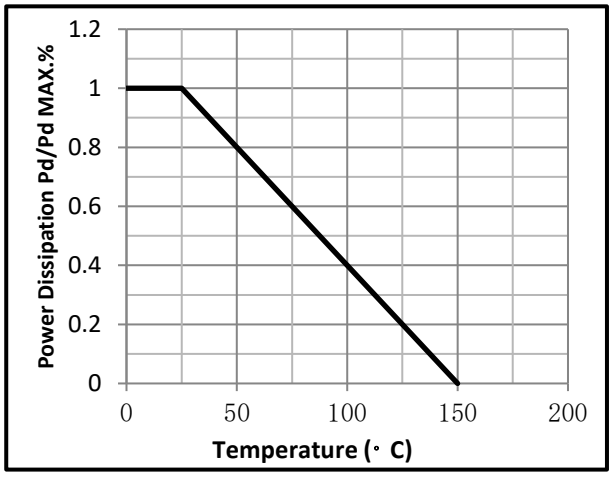


Fig.12 Typical output Characteristics

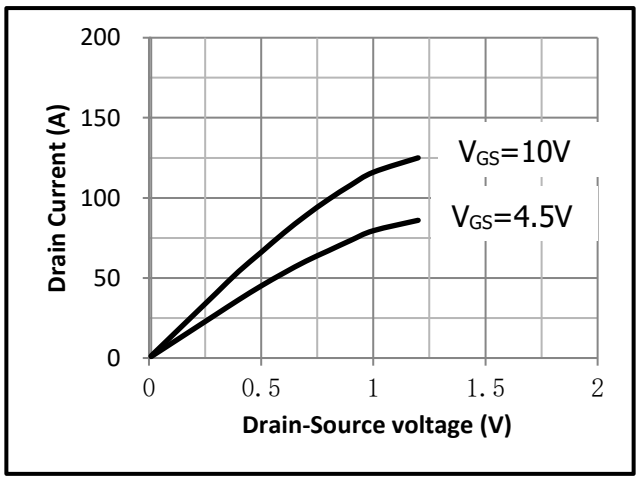


Fig.13Threshold Voltage V.S Junction Temperature

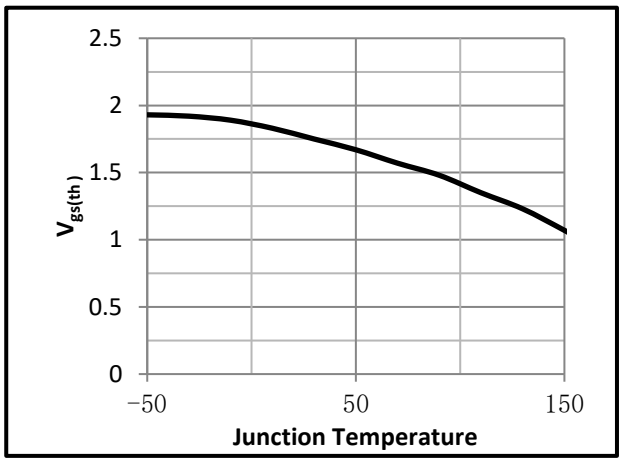


Fig.14 Resistance V.S Drain Current

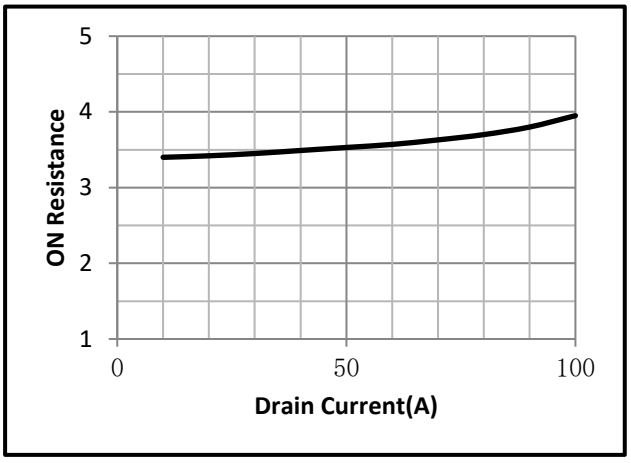


Fig.15 On-Resistance VS Gate Source Voltage

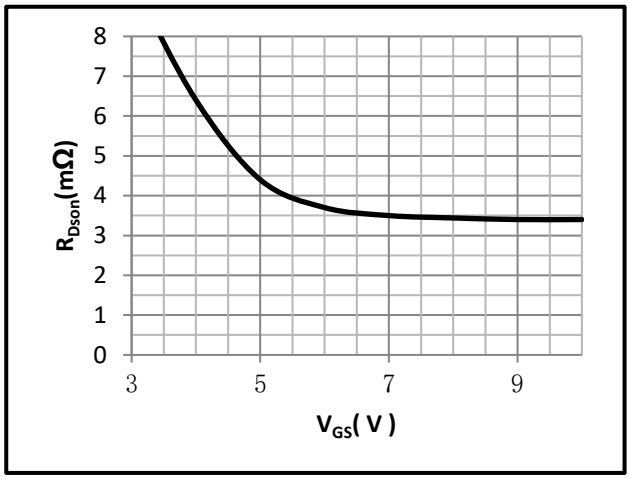


Fig.16 On-Resistance V.S Junction Temperature

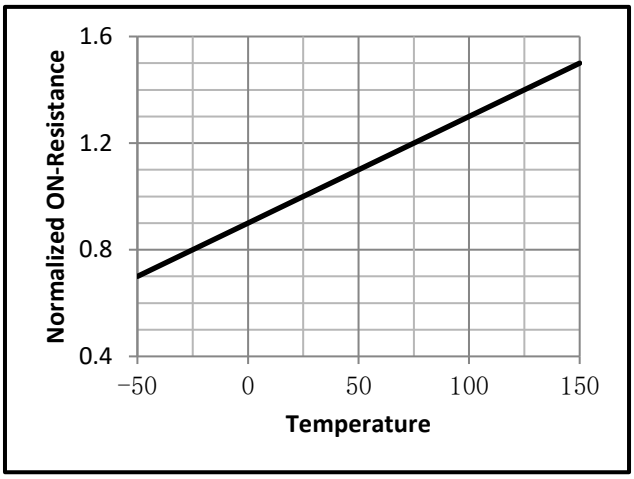


Fig.17 Switching Time Measurement Circuit

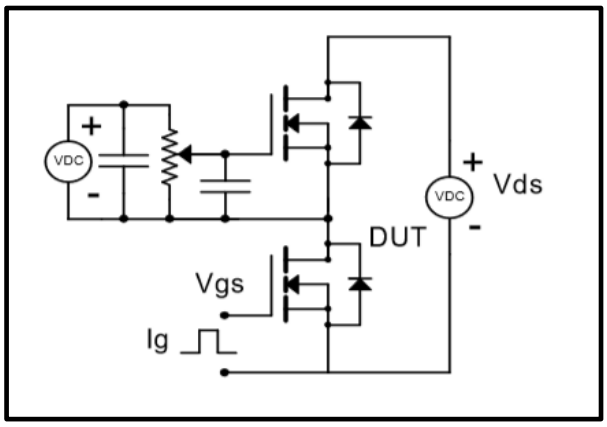


Fig.18 Gate Charge Waveform

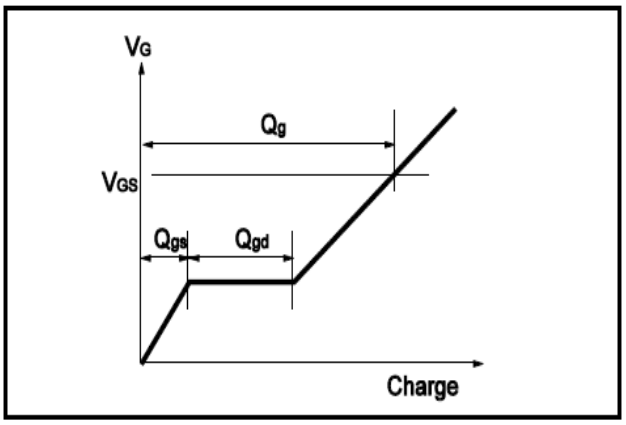


Fig.19 Switching Time Measurement Circuit

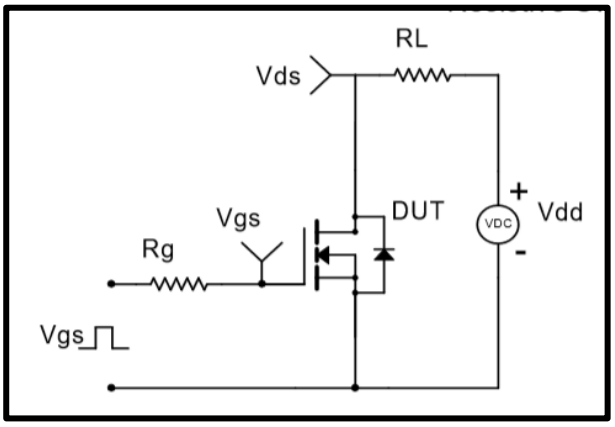


Fig.20 Gate Charge Waveform

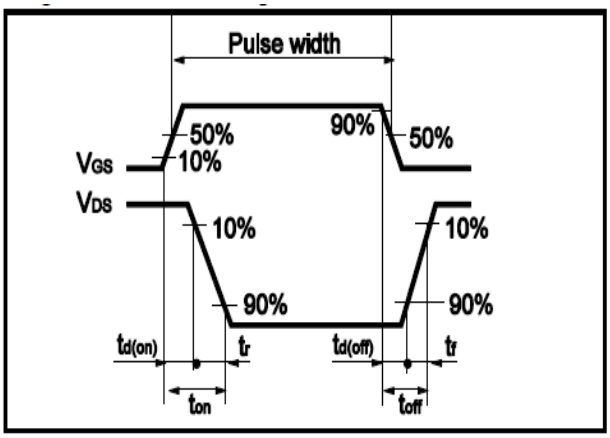


Fig.21 Avalanche Measurement Circuit

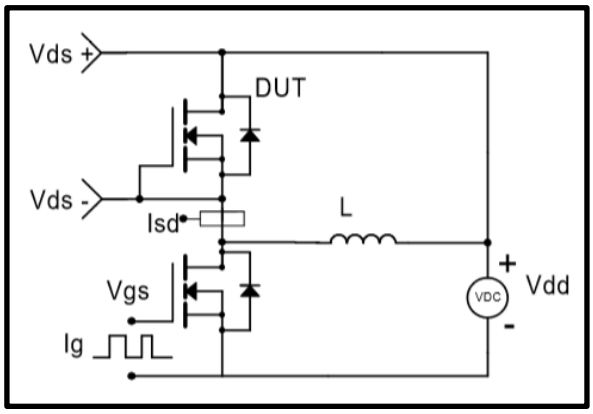
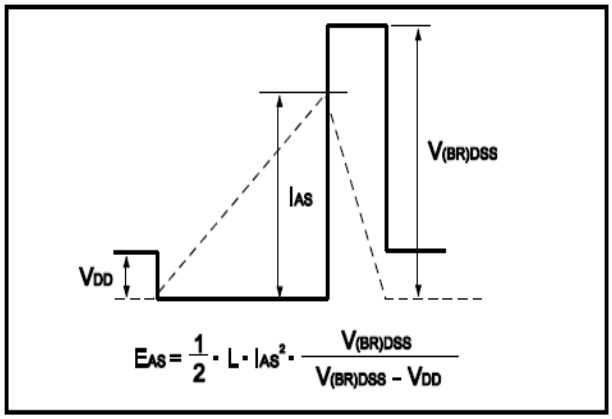
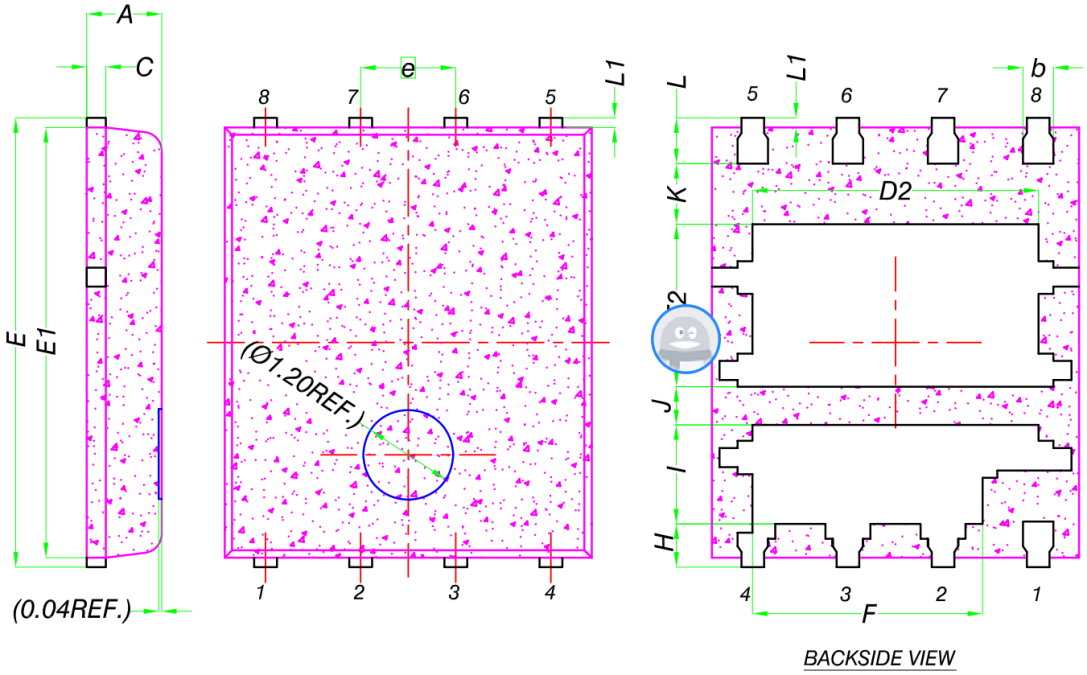


Fig.22 Avalanche Waveform



●Dimensions（DFN5×6）

Unit：mm



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	2.02	2.17	2.32
e	1.27 BSC		
F	2.87	3.07	3.22
H	0.48	0.58	0.68
I	1.22	1.32	1.42
J	0.40	0.50	0.60
K	0.50	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°